Remarks/Arguments

Applicants are submitting this Amendment together with a Request for Continued Examination (RCE) under 37 CFR 1.114. Please reconsider the application in view of the above amendments and the following remarks.

Procedural History

Claims 48 and 49 were allowed in the final Office Action dated April 5, 2006 without any rejection of those claims. Applicants filed a Reply dated July 5, 2006 to cancel the rejected claims and proceed with the allowed claims 48 and 49. Despite the allowance of claims 48 and 49, an Advisory Action was mailed on July 27, 2006 refusing to enter this amendment after final because "copper is not disclosed in the specification." Applicants filed a Supplemental Reply After Final on August 4, 2006 with an amendment to the specification to provide explicit support for "copper" and to point out that this amendment did not add new matter because "copper" was recited in the original claims. Another Advisory Action dated August 22, 2006 again indicated that the amendment was not entered on the grounds of new matter. To preserve applicants right to appeal the final rejection while attempting to resolve the new matter issue, applicants filed a Notice of Appeal on October 5, 2006. After discussing the issue with the examiner in a telephone interview on November 3, 2006, applicants decided to file this RCE and Amendment in an effort to advance the application and expedite allowance of the claims.

Examiner Interview

Applicants appreciate the telephonic interview courteously granted by the examiner on November 3, 2006. Applicants' attorney of record called the examiner to discuss why the examiner refused entry of the amendments made in the Supplemental Reply After Final dated August 4, 2006. The Advisory Action mailed August 22, 2006 asserted that the amendment raised the issue of new matter because "copper was never disclosed in the original specification." Applicants' attorney of record pointed out, as was also argued in the Reply of August 4, 2006, that copper was recited in original claim 15 and the claims as filed in the original specification are part of the disclosure. Although the examiner appeared to agree with this point, the examiner

did not agree to enter the amendment and allow the claims, which had been allowed in the final Office Action dated April 5, 2006. The examiner suggested that prosecution might be re-opened.

Status of Claims

Claims 1-14, 16-20 and 41-47 stand rejected and claims 48 and 49 have been allowed. Claim 1 is amended to incorporate the subject matter of dependent claim 18 and to provide further clarification. Dependent claim 18 is canceled without prejudice.

Amendments

To provide explicit support for the claimed limitation in the specification, applicants have now amended paragraph 0067 of the specification to state "metal films such as copper or molybdenum." As argued in the Reply of August 4, 2006, this amendment does not introduce new matter because copper was recited in original claim 15 and the claims as filed in the original specification are part of the disclosure. Paragraph 0052 of the specification is also amended to correct a minor informality by changing the reference numeral "60" to "62."

Claim 1 has been amended to recite "moving said substrate in a cutting direction along said length of said astigmatic focal beam spot such that said astigmatic focal beam spot causes ablation of said substrate to obtain at least a partial cut in said substrate," which includes subject matter from dependent claim 18. Claim 1 has also been amended to recite "said astigmatic focal beam spot having an elongated shape with a focused axis having a first focal point and an astigmatic axis having a second focal point separate from said first focal point, said astigmatic focal beam spot having a length along said astigmatic axis and a width along said focused axis, the width being less than the length." Support for this amendment may be found in the original specification, for example, in paragraphs 0050 to 0052 and FIGS. 3-5. Applicants submit that these claim amendments clarify the characteristics of the astigmatic focal beam spot recited in original claim 1.

Rejections under 35 U.S.C. §103

Claims 1-14, 16-20, and 41-47 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 4,752,922 to MacAnally, et al. ("MacAnally") in view of U.S.

Pat. No. 6,266,302 to Yamanaka ("Yamanaka") and U.S. Patent No. 6,580,054 to Liu et al. ("Liu"). Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over MacAnally, Yamanaka and Liu and further in view of U.S. Pat. No. 5,181,224 to Snyder ("Snyder"). Applicants respectfully traverse these rejections.

Applicants respectfully submit that the Office action fails to establish a *prima facie* case of obviousness.

First, applicants submit that MacAnally and Yamanaka are not analogous art. To rely on a reference under 35 U.S.C. §103, it must be analogous prior art. See MPEP 2141.01(a). To be analogous prior art, the reference must either be in the field of applicant's endeavor or be reasonably pertinent to the particular problem with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The present claimed invention is in the field of "laser cutting or machining, and more particularly, relates to a system and method for forming a variable astigmatic focal beam spot using solid-state lasers with an anamorphic beam delivery system to scribe semiconductor wafers" (see present specification, ¶0002). In contrast, both MacAnally and Yamanaka are in the field of optical disks for storing or recording information (see MacAnally, Abstract, andYamanaka, Abstract). Thus, neither MacAnally, nor Yamanaka, are within the field of applicant's endeavor.

The inventors in the present application were concerned with problems in laser material processing applications, such as scribing speeds, optimum laser intensity or energy density of a focused beam and/or minimum size of a focused beam spot (see present application, ¶¶0013 and 0014). Both MacAnally and Yamanaka address problems related to reading and writing information on an optical disk (see MacAnally, col. 2, lines 48-59, andYamanaka, col., 2, lines 32-51). Applicants are unable to find any disclosure in either MacAnally or Yamanaka suggesting that these references are pertinent to the particular problem with which the inventor is concerned in the present application. Because neither MacAnally, nor Yamanaka, is analogous prior art that may be properly relied on in the rejection under 35 U.S.C. §103, applicants request that the rejection under 35 U.S.C. §103 be withdrawn.

Applicants further submit that even if the references, MacAnally, Yamanaka, and Liu, could be combined in the manner suggested in the Office Action, the combination would not teach or suggest all of the claimed elements and limitations. To establish *prima facie*

obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. MPEP 2143.03.

In the Reply dated January 18, 2006, which is incorporated herein by reference, applicants had previously argued that neither MacAnally, nor Yamanaka, disclose an astigmatic focal beam spot that is used to obtain at least a partial cut in a substrate. To provide further clarification, independent claim 1 has been amended to recite "moving said substrate in a cutting direction along said length of said astigmatic focal beam spot such that said astigmatic focal beam spot causes ablation of said substrate to obtain at least a partial cut in said substrate." As mentioned above, both MacAnally and Yamanaka relate to optical disk recording systems. Although there may be some mention of astigmatic lenses or elements in these systems, neither of these references discloses an astigmatic focal beam spot that is moved in a cutting direction along the length of the astigmatic focal beam spot to cause ablation of a substrate. In fact, causing ablation of an optical disk in this way would likely destroy the optical disk.

Independent claim 1 has also been amended to clarify that the astigmatic beam spot has "an elongated shape with a focused axis having a first focal point and an astigmatic axis having a second focal point separate from said first focal point, said astigmatic focal beam spot having a length along said astigmatic axis and a width along said focused axis, the width being less than the length." Such an astigmatic focal beam spot may provide a number of advantages when used to ablate and cut a substrate, as described in greater detail below. Although MacAnally and Yamanaka mention astigmatic lenses or elements, applicants are unable to find any disclosure of an astigmatic focal beam spot that has a length along an astigmatic axis and a lesser width along a focused axis.

Liu is relied on in the Office Action as teaching the scribing of a sapphire substrate with a solid state UV laser. Liu fails to teach or suggest, however, the elements and limitations that are missing from MacAnally and Yamanaka as described above. Liu discloses a scribing system and method that uses a circular beam spot, not an astigmatic beam spot having a different width and length, as recited in amended independent claim 1.

Moreover, nothing in MacAnally and Yamanaka suggests the desirability of using an astigmatic focal beam spot in the scribing system and method of Liu. MacAnally describes a coarse seek function in which a coarse seek beam 6 is astigmatized to form a line focused spot 25

on the disk 1 surface (col. 6, lines 57-64). The line focused spot 25 is used for the proper operation of the coarse servo tracking system, not to form a cut in the optical disk or any other substrate. MacAnally also refers to an astigmatic focusing lens system 51 in the read optical train, which introduces an astigmatism into the reflected read beams 50 before focusing the reflected read beams 50 onto a detector array 52 (col. 11, lines 8-24). However, the reflected read beams 50 do not form a cut in the detector array 52. Similar to the read operation in MacAnally, Yamanaka discloses that a beam reflected by an optical disk 105 is passed through an astigmatic element 107 to form an astigmatic beam that is received by a photodetector 108 (col. 3, lines 32-42). The astigmatic beam in Yamanaka, however, is not directed at the photodetector 108 to form a cut in the photodetector. Thus, one of ordinary skill in the art would not have been motivated by the teachings of MacAnally or Yamanaka to use an astigmatic beam spot, as recited in amended claim 1, in the scribing system and method of Liu.

Because MacAnally, Yamanaka, and Liu, even if they could be combined, fail to teach or suggest all of the elements and limitations recited in amended independent claim 1, applicants submit that claim 1 would not have been obvious over this combination of references. Accordingly, applicants request that the rejection under 35 U.S.C. §103 be withdrawn.

Furthermore, applicants submit that the methods recited in amended independent claim 1, and the claims dependent therefrom, may provide a number of advantages. The claimed method(s) may enable faster scribing speeds by increasing the length of the focused beam, for example, as described in paragraph 0057 of the present specification. The claimed method(s) may also facilitate optimization of the processing parameters such as energy density, for example, as described in paragraphs 0058 and 0061-0063. In particular, the claimed method(s) of forming an astigmatic beam spot to ablate and cut a substrate, such as sapphire, may prevent an overflow of laser energy density that can cause thermal damage and may prevent a lack of energy density that can cause improper ablation. The claimed method(s) may further enable a minimized spot size in the focused axis to reduce the scribing kerf width, for example, as described in paragraph 0064 of the present application. For these additional reasons, applicants submit that the method recited in amended independent claim 1, and the claims dependent therefrom, would not have been obvious to one of ordinary skill in the art and request that the rejection under 35 U.S.C. §103 be withdrawn.

Claims 2-14, 16, 17, 19, 20, and 41-49 all depend, either directly or indirectly, from independent claim 1. Applicants submit that these dependent claims are patentable by virtue of their dependency and for the additional limitations recited therein. By way of example, the combination of references does not appear to disclose or suggest varying the convergence (claim 7), symmetrically cropping low intensity edges (claim 9), or creating a plurality of separated astigmatic beamlets (claim 19). In fact, the Office Action never addresses any of these claimed features. Thus, applicant submits that the dependent claims are separately patentable.

Conclusion

The examiner is invited to telephone the undersigned, applicant's attorney of record, to facilitate advancement of the present application.

Please apply any charges not covered, or any credits, to Deposit Account 50-2121 (Reference Number JPSA001).

Respectfully submitted,

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